



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,370	04/29/2002	Valeri Kiselev	AC FZJ 4903 (JT-8)	7935
7590		11/18/2003	EXAMINER	
Connolly Bove Lodge & Hutz		VARGAS, DIXOMARA		
P O Box 2207		ART UNIT		
Wilmington, DE 19899-2207		PAPER NUMBER		

2859

DATE MAILED: 11/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/019,370

**Applicant(s)**

KISELEV ET AL.

**Examiner**

Dixomara Vargas

**Art Unit**

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 22-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 22-37 and 40 is/are rejected.
- 7) ☒ Claim(s) 38,39,41 and 42 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☒ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Specification*

1. The substitute specification filed on 09/11/2003 has been entered.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 22-27, 29-32 and 40 are rejected under 35 U.S.C. 102(e) as being anticipated by Zhang et al. (US 6,147,492 A).

With respect to claims 22, 24 and 25, Zhang discloses a computer-implemented system for analyzing nuclear magnetic resonance data, wherein the data contains at least one relaxation signal of a sample, the system comprising: at least one analyzing means that separates the data into at least two parts that are differently dependent on an echo time TE (Column 7, lines 5-22; Figures 1 and 3, #19).

4. With respect to claims 23 and 29, Zhang discloses said analyzing means separates the data into at least one part that is dependent on the echo time TE and into at least another part that is not dependent on the echo time TE, and said analyzing means acquires the data that is

Art Unit: 2859

dependent on the echo time TE as activation signals (Column 7, lines 5-38; Figures 1 and 3, #19).

5. With respect to claim 26, Zhang discloses the step of separating intensity values of the data into at least two parts that are differently dependent on the echo time TE (Column 14, lines 25-44).

6. With respect to claim 27, Zhang discloses the step of calculating a statistical variation of the intensities (Column 14, lines 25-44).

7. With respect to claim 30, Zhang discloses the step of calculating at least one signal that is proportional to  $TE \exp(-TE / T2^*)$  (Column 9, lines 40-67).

8. With respect to claim 31, Zhang discloses the step of calculating  $TE \exp(-TE / T2^*) + g$  (Column 9, lines 40-67).

9. With respect to claim 32, Zhang discloses the step of calculating statistical fluctuations of  $\Delta T2^*$  (Columns 9-10, lines 40-67 and 1-10).

10. With respect to claim 40, Zhang discloses the step of acquiring the data in a two-dimensional field, wherein a field axis (DTE) acquires the echo times TE, and another field axis (DTR) reproduces repetitions of excitations at a time interval TR (Figure 3).

### ***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2859

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 28 and 33-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (US 6,147,492 A in view of Brown (US 5,410,250 A).

With respect to claims 28, 33, 35 and 36, Zhang discloses the claimed invention as stated above in paragraph 2 except for the step of calculating a standard deviation of the intensities. However, Brown discloses the step of calculating a standard deviation of the intensities (Column 7, lines 18-31). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Brown's teachings about the standard deviation with Zhang's computer-implemented method for the purpose of providing quantitative data supporting qualitative assessments of tissue contrast behavior as shown by Brown (Column 7, lines 18-31).

14. With respect to claims 34 and 37, Zhang discloses the step of calculating a quotient  $\Delta T2^* / T2^*$  that represents a measure of an activity (Columns 10-12, lines 32-67, 1-67 and 1-8 respectively).

*Allowable Subject Matter*

15. Claims 38, 39, 41 and 42 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. The following is a statement of reasons for the indication of allowable subject matter:

a. With respect to claim 38, the claim has been found allowable over the prior art because the prior art fails to teach or fairly suggest a computer-implemented method for analyzing NMR data, wherein the data contains at least one relaxation signal of a sample comprising the step of: calculating a statistical fluctuation of a noise signal  $g$  in combination with the remaining limitations of claim 25 above.

b. With respect to claim 39, the claim has been found allowable due to its dependency on claim 38 above.

c. With respect to claim 41, the claim has been found allowable over the prior art because the prior art fails to teach or fairly suggest a computer-implemented method for analyzing NMR data, wherein the data contains at least one relaxation signal of a sample comprising the steps of calculating a standard deviation  $\sigma(\Delta T2^*)$  and a standard deviation  $\sigma(g)$  of a noise signal  $g$  using the following steps: averaging signals over DTR to an exponential decay as a function of DTE and determining  $S_0$  and  $T2^*$ ; calculating  $\sigma(\Delta S_0)$ ,  $\sigma(\Delta T2^*)$  and  $\sigma(g)$  for several voxels and different TE, followed by averaging these values over at least one region of interest (ROI); calculating:

Art Unit: 2859

$$\frac{\sigma(\Delta S)}{S_0} = \left\{ \left[ \left( \frac{T_E}{T_1^*} \right)^2 \left( \frac{\sigma(\Delta T_2^*)}{T_2^*} \right)^2 + \left( \frac{\sigma(\Delta S_0)}{S_0} \right)^2 - 2 \frac{T_E}{T_2^*} \frac{\langle \Delta S_0 \Delta T_2^* \rangle}{S_0 T_2^*} \right] e^{-2T_E/T_1^*} + \left( \frac{\sigma(g)}{S_0} \right)^2 \right\}^{1/2}$$

and determining  $\sigma(\Delta S)/S_0$  as a function of TE in combination with the remaining limitations of claim 25 above.

d. With respect to claim 42, the claim has been found allowable due to its dependency on claim 41 above.

### ***Response to Arguments***

17. Applicant's arguments with respect to claims 22-42 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

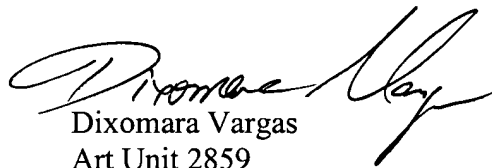
18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional prior art cited in the PTO 892 discloses an NMR method that separates the data into at least two parts that are differently dependent on an echo time TE.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dixomara Vargas whose telephone number is (703) 305-5705. The examiner can normally be reached on 8:00 am. to 4:30 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on (703) 308-3875. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3432.

Art Unit: 2859

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0956.



Dixomara Vargas  
Art Unit 2859  
November 9, 2003



Diego Gutierrez  
Supervisory Patent Examiner  
Technology Center 2800